

**A New Species of the Bathyal Lobster Genus *Nephropsis*
(Crustacea: Decapoda: Nephropidae)
from Australian Waters,
with a Redescription of *N. holthuisi***

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Nephropsis macphersoni is newly described based on two specimens, male and female, from the bathyal zone in Australian waters. One of the specimens was previously designated as the paratype of *N. holthuisi* Macpherson, 1993. To clarify the taxonomic status of *N. holthuisi* in the genus, it is redescribed on the basis of the holotype and additional specimens mainly from Japanese waters.

Key Words: *Nephropsis macphersoni*, *Nephropsis holthuisi*, new species, redescription, new record, lobster.

Introduction

Nephropsis holthuisi Macpherson, 1993 (Crustacea: Decapoda: Nephropidae) was originally described from a pair of specimens taken from the bathyal zone off northwestern Australia (Macpherson 1993; Griffin and Stoddart 1995). It has also been found off Indonesia (Chan 1997).

There are two problems with its taxonomic status. First, the distinction between *N. holthuisi* and its most similar congener, the Atlantic species *N. rosea* Bate, 1888, is unclear due to the small number of specimens referred to *N. holthuisi* that have been examined so far. In spite of several key characteristics pointed out by Chan (1997), such as the relative position of the gastric tubercle on the carapace and the shape of the anterior margin of the second abdominal pleuron, more specimens need to be examined to determine whether *N. holthuisi* is a valid species or not. Second, the conspecificity of the type series in the original description also seems to be problematic. Some morphological differences have been recognized between the holotype and paratype of *N. holthuisi*, but the specimens had not been reexamined closely before our study (Griffin and Stoddart 1995; H. E. Stoddart, pers. comm.).

For the Japanese species of *Nephropsis*, the following taxonomic problem remains unresolved. Balss (1914) made a brief report on *N. carpenteri* Wood-Mason, 1885, based on a single specimen in the collection of the Tokyo Museum (the predecessor of the National Science Museum, Tokyo), which was from Yodomi, a knoll located west of Misaki in the eastern part of Sagami Bay (Balss 1924). However, subsequent studies have cast doubt on his identification (Macpherson 1990; L. B. Holthuis, pers. comm.). Watabe and Ikeda (1994) tentatively suggested that Balss's material represents an undescribed species. Unfortunately, his

identification can never be verified rigorously, since the relevant specimen has been lost (M. Takeda, pers. comm.). Taxonomic inferences can only be made based on other material from Sagami Bay and neighboring waters.

Nephropid lobsters of the genus *Nephropsis* are frequently collected from the bathyal zone in Suruga Bay, which neighbors Sagami Bay (Iwata *et al.* 1992). The junior author (EI) has also collected them from the refuse of commercial trawlers in Heda, a fishing port in the northwestern part of the Izu Peninsula. Most of these are referable to *N. stewarti* Wood-Mason, 1873, which is common in Japanese waters (Miyake 1982; Baba, *in* Baba *et al.* 1986; Watabe and Ikeda 1994). However, unusual specimens that differ morphologically from those referable to *N. stewarti* are also found. Furthermore, specimens that appear to be identical to these "unusual" specimens have been found in the collection of the Ocean Research Institute, University of Tokyo, collected from Suruga Bay, and in the personal collection of H. Ikeda, collected from Sagami Bay. These are examined in this paper.

This paper primarily intends to provide a sounder basis for the taxonomic system around *N. holthuisi*. Close examination discloses that (1) the morphologically unusual specimens from Sagami and Suruga Bays represent the first record of *N. holthuisi* in Japanese waters, (2) the single specimen in Balss (1914) might also be referable to *N. holthuisi*, and (3) the paratype of *N. holthuisi* and a male specimen erroneously referred to this species by Griffin and Stoddart (1995) represent a distinct species, which is described here as new to science.

The terminology used for body parts follows Holthuis (1991). The measurements refer to the carapace length including the rostrum. The following abbreviations of institutions and collections are used: Australian Museum (AM); Iizuka's personal collection (IZC); Ikeda's personal collection (IKC); Muséum National d'Histoire Naturelle, Paris (MNHN); National Science Museum, Tokyo (NSMT); Northern Territory Museum of Arts and Sciences (NTM); Ocean Research Institute, University of Tokyo (ORI).

Family Nephropidae

Nephropsis Wood-Mason, 1873

Nephropsis holthuisi Macpherson, 1993

(Figs 1, 2)

?*Nephropsis carpenteri*. - Balss, 1914: 83. [not Wood-Mason, 1885]

Nephropsis holthuisi Macpherson, 1993: 55 (part), figs 1-3 (fig. 3B erroneously labelled as *N. serrata* Macpherson, 1990), 6B. - Chan, 1997: 414.

not *Nephropsis holthuisi*. - Griffin and Stoddart 1995: 234 [= *N. macphersoni* new species].

Material examined. - Northeastern Australia. Holotype, ♂ (47.3 mm), NTM Cr007044, Indian Ocean, west of Ashmore Reef, St. S9, 13°06'S, 122°18'E, 900-1000 m deep, coll. B. Wallner, 25 Jan. 1988.

Sagami Bay. "IKC": 1 ♂ (52.6 mm), off Oiso, northwestern Sagami Bay, 350-400 m deep, mud, lobster pot, coll. H. Ikeda, 3 Apr. 1980.

Suruga Bay. "NSMT": 1 ♂ (50.4 mm) and 1 non-ovig. ♀ (50.6 mm), NSMT-Cr 12181, off Heda, 350 m deep, muddy sand with broken shells, commercial trawl, coll.

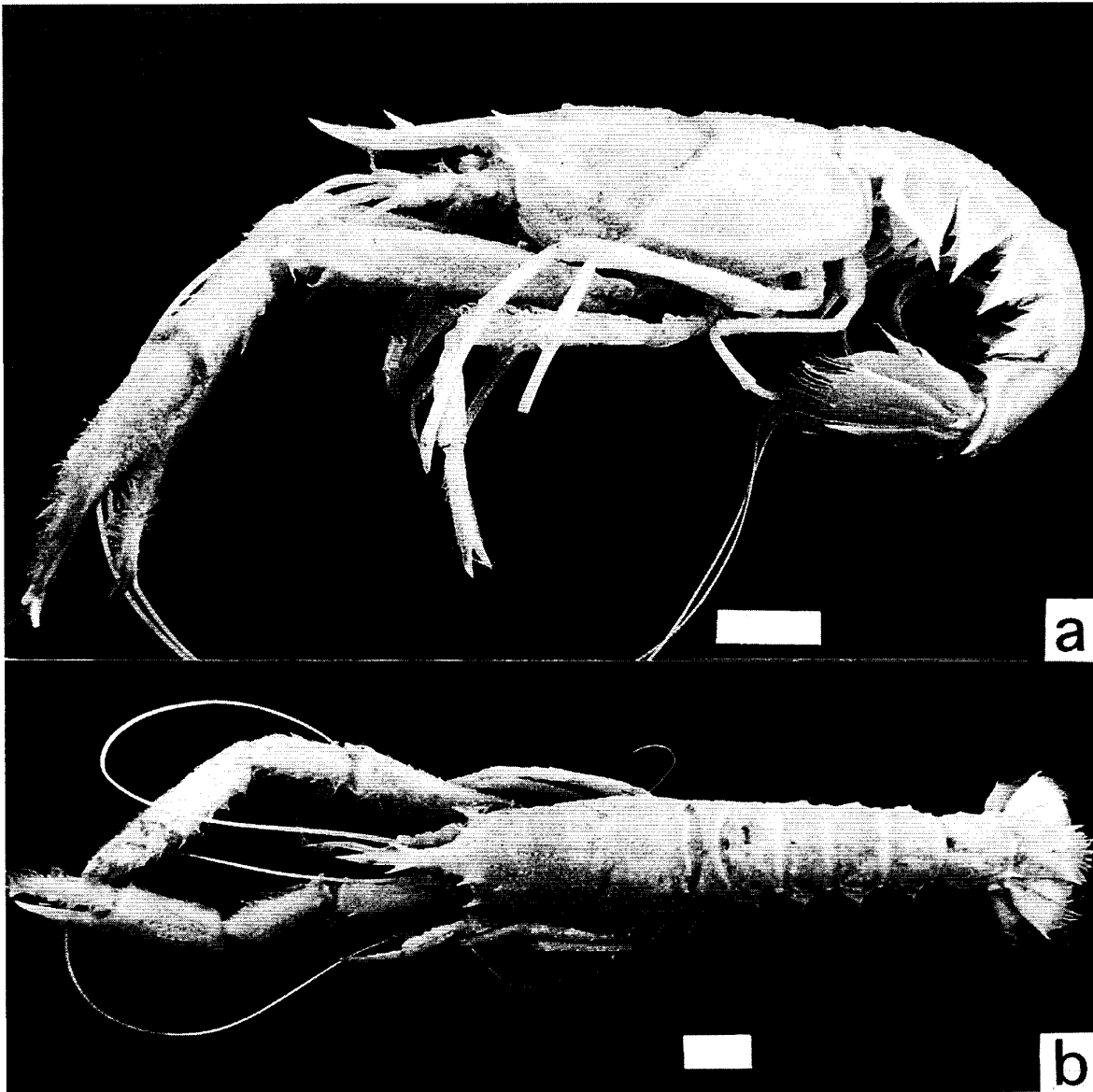


Fig. 1. *Nephropsis holthuisi* Macpherson, 1993, male from Suruga Bay, NSMT-Cr 12181: a, lateral view; b, dorsal view. Scale=10 mm.

El, 25 Feb. 1993. "IZC": 28 ♂♂ (46.0-59.8 mm) and 14 non-ovig. ♀♀ (36.9-54.0 mm), off Heda, 350-400 m deep, muddy sand with broken shells, commercial trawl, between Nov. 1993 and May 1995. ORI (specimens collected during scientific cruises of R/V "Tansei Maru"): 1 ♂ (34.1 mm) and 1 non-ovig. ♀ (49.3 mm), KT-78-18, St. OT-10, 34° 53.9'N, 138° 43.1'E - 34° 55.6'N, 138° 43.6'E, 382-425 m deep, fine sand and mud, 15-foot otter trawl, 20 Nov. 1978; 1 ♂ (44.8 mm), KT-78-18, St. OT-11, 34° 54.3'N, 138° 42.8'E - 34° 54.8'N, 138° 42.9'E, 520-545 m deep, fine sand and mud, 15-foot otter trawl, 23 Nov. 1978; 1 non-ovig. ♀ (53.0 mm), KT-78-18, St. OT-12, 34° 55.0'N, 138° 42.7'E - 34° 53.2'N, 138° 42.6'E, 516-630 m deep, fine sand and mud, 15-foot otter trawl, 23 Nov. 1978; 1 ♂ (48.7 mm), KT-89-06, St. SB27, 34° 41.23'N, 138° 22.14'E -

34°41.86'N, 138°21.76'E, 444-468 m deep, fine sand and mud, 2 m S.-A. beam trawl, 18 May 1989.

Kai Islands, Indonesia. MNHN: 1 ♂ (22.2 mm), unregistered, Campagne KARUBAR, St. CP-38, 07°40'S, 132°27'E, 620-666 m deep, 28 Oct. 1991.

Description of holotype. Carapace stout, comprising 44% of total body length, slightly granulose, densely covered with fine, short setae (Fig. 1a). Rostrum long, slender, depressed dorsoventrally, 0.53 times as long as rest of carapace; lateral ridge moderately developed, densely covered with minute tubercles; ventral ridge less developed. Rostral dorsolateral spines robust, triangular, located at midpoint of rostrum. Rostral dorsal carina weakly developed, sparsely covered with small tubercles. Subdorsal carinae less developed, with coarse tubercles but no spine. Median groove distinct between rostral lateral spines and level of supraorbital spines, successively diminishing posteriorly, but reaching posterior margin of carapace. Supraorbital spine robust, somewhat compressed and needle-like, smaller than rostral spine. Antennal spine strong, directed anterolaterally, subequal to rostral lateral spines. Postsupraorbital spine extremely small, accompanied by 2 or 3 large tubercles. Hepatic spine absent. Distance between gastric tubercle and supraorbital spine, measured along midline of carapace, 0.42 times as long as distance between gastric tubercle and cervical groove. Cervical groove distinct, W-shaped in dorsal view. Hepatic, intermediate and lateral grooves distinct. Distance between orbital margin and cervical groove 1.65 times as long as distance between cervical groove and posterior margin of carapace.

Eyes small, extending to midway between rostral spines and supraorbital spines.

Abdomen slender, comprising 56% of total body length (Fig. 1b). Second to sixth abdominal somites with weak median carina. Tergites densely covered with short, fine setae, separated from pleura by distinct curved ridge without granules. Pleura densely pubescent, granulose, successively smaller posteriorly, with each margin unarmed. Second pleuron strongly convex. Third to sixth pleura straight, each ending in long, sharp apex.

Ischium of third maxilliped with mesial ridge bearing a row of 13 or 14 blunt teeth, distalmost largest, remainder diminishing in size proximally (Fig. 2a).

First to third pereopods chelate. First pereopod 1.59 times as long as carapace, slender, heavily pubescent with long, fine setae through entire length. Chelae (Fig. 1a, b) subcylindrical, 4.00 times as long as high, sparsely granulose. Fixed and movable fingers depressed, slightly shorter than palm, distally naked, strongly curved inward; each with approximately 30 small teeth. Carpus slender, as long as palm; mesial margin with a small spine located at midpoint; ventral margin with a robust spine distally; distodorsal margin with a strong spine mesially. Merus also pubescent; dorsal margin with a strong spine distally; distoventral margin unarmed. Second pereopod slender, heavily pubescent on merus and carpus but almost naked on propodus; carpus slightly shorter than palm; coxa bearing large, triangular process. Third pereopod more slender than second pereopod; carpus 0.68 times as long as palm; coxa with broad plate ending in 4 curved, claw-like teeth, anterior three small and posterior one large (Fig. 2b). Fourth pereopod slightly longer than fifth pereopod. Dactyli of fourth and fifth pereopods half as long as propodi.

First pleopod (Fig. 2c) straight, narrowing distally, with rounded apex. Distal part slightly concave mesially. Anterior margin with deep, narrow incision at midlength. Appendix masculina of second pleopod shorter than exopod and endopod.

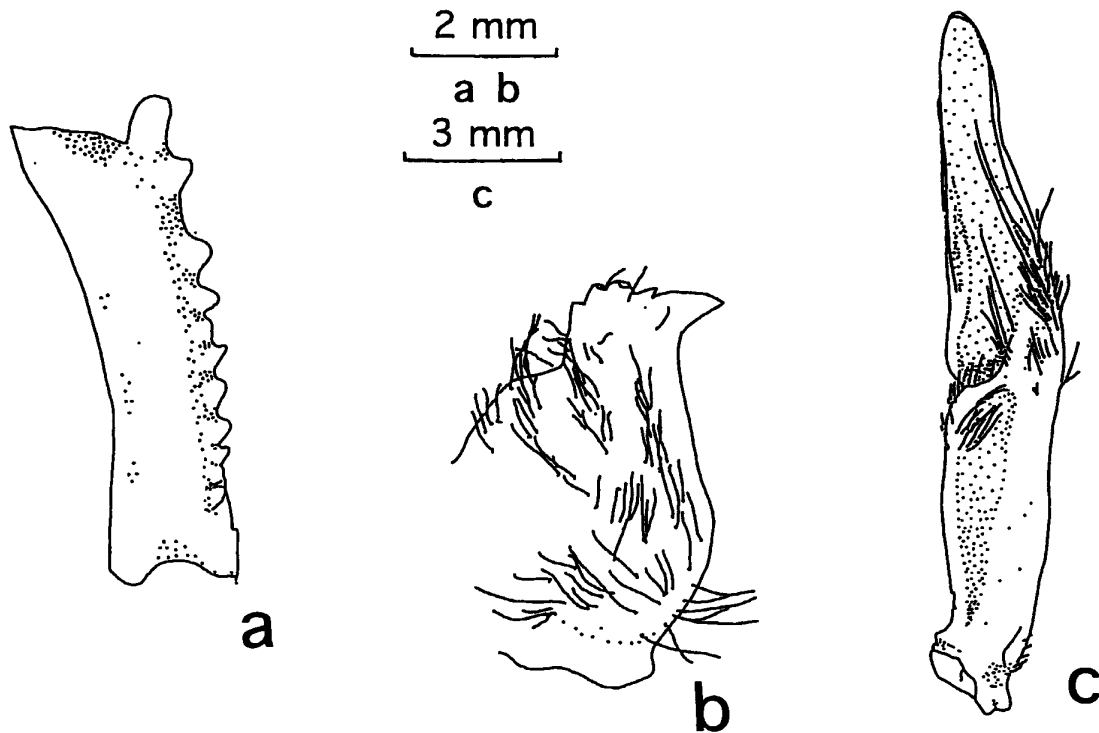


Fig. 2. *Nephropsis holthuisi* Macpherson, 1993, male from Suruga Bay, NSMT-Cr 12181: a, ischium of left third maxilliped, inner view, setae omitted; b, coxa of right third pereopod, anterior view; c, left first pleopod, mesial view.

Uropodal exopod bearing a distinct and complete dieresis, with a spine on outer border. Lateral lobe of uropodal protopod ending in a spine. Mesial lobe distinct. Dorsal surface of telson with a blunt spine.

Variation. Other examined males almost identical to holotype morphologically. In females, no spine on coxa of third pereopod. Thelycum raised and bisected by a narrow median groove; anterior margin with double-ridged, bluntly triangular lobes; posterior margin with 2 semicircular ridges; posterior incision broad. Merus of first pereopod with a small, sharp spine on distomesial margin of ventral surface.

Remarks. *Nephropsis holthuisi* belongs to the species group characterized by the following combination of features: (1) a pair of lateral spines on the rostrum; (2) the absence of spines on the anterior borders of the abdominal pleura; (3) the presence of a dieresis in the uropodal exopod; (4) the presence of the median carina on the abdomen (Macpherson 1990). This group also contains the species that is morphologically closest to *N. holthuisi*, *N. rosea*, from the Atlantic, and another Australian species, *N. macphersoni*, new species.

Besides the discriminating characteristics provided by the original description (Macpherson 1993) and by Chan (1997), the following differences were recognized between our specimens and specimens referable to *N. rosea* examined in the present study (5 ♂♂ (43.6-48.6 mm), 5 non-ovig. ♀♀ (42.8-55.8 mm), and 1 ovig. ♀ (55.6 mm), NSMT-Cr 8876, off Suriname): (1) palm of first pereopod slightly compressed dorsoventrally in *N. rosea* (2.94-3.31 and 3.07-3.36 times as long as high in the male and female, respectively), but slender and subcylindrical in *N. holthuisi* (more than

3.4 times as long as high in both sexes); (2) a large spine on mesial margin of carpus of first pereopod often accompanied by 1-3 accessory spines in *N. rosea* (also illustrated in Holthuis (1974): fig. 17C), but no accessory spines or granules in *N. holthuisi*; (3) in males, broad plate on coxa of third pereopod usually ending in 3 spines in *N. rosea*, whereas ending in 3-5, most frequently 4, spines in *N. holthuisi*. Especially, point (2) seems to be the most effective way to distinguish *N. holthuisi* from *N. rosea*.

Balss (1914) briefly described the presence of the median carina on the second abdominal segment in the specimen he examined. This coincides with the morphological characteristics in *N. holthuisi*. From the geographic range of *N. holthuisi* inferred from the present materials, his specimen might also be referable to *N. holthuisi*.

Distribution. Known from waters off northeastern Australia (off Ashmore Reef; type locality), Indonesia, and central Japan, 350-1000 m deep. Off Heda, the bathymetric range of the species seems to be restricted to a deeper zone (350-500 m deep) than that of *N. stewarti* (200-400 m deep) (EI, unpublished data).

***Nephropsis macphersoni* new species**
(Figs 3, 4)

Nephropsis holthuisi. - Macpherson, 1993: 55 (in part). - Griffin and Stoddart, 1995: 234. [not Macpherson, 1993]

Material examined. Holotype, ♂ (32.6 mm), AM P44029, St. K88-17-04, east of Terrigal, NSW, 33°33S, 152°10E, 1080-1135 m deep, trawl, coll. F/V "Kapala", 31 Aug. 1988. Paratype, ovig. ♀ (40.4 mm), NTM Cr007043 [paratype of *N. holthuisi*], west off Ashmore Reef, WA, 13°06S, 122°18E, 900-1000 m deep, coll. B. Wallner, 25 Jan. 1988.

Description of holotype. Carapace stout, comprising 47% of total body length, slightly granulose and densely covered with fine, short setae (Fig. 3a). Rostrum long, slender, and depressed dorsoventrally, 0.68 times as long as rest of carapace; lateral ridge well developed, densely armed with minute tubercles; ventral ridge weakly developed. Rostral dorsolateral spines strong and triangular, located at midpoint of rostrum. Dorsal rostral carina weakly developed, sparsely covered with small tubercles. Subdorsal carinae well developed, coarsely covered with tubercles, and armed with 3 pairs of sharp spines. Median groove distinct between rostral lateral spines and level of supraorbital spines, successively diminishing posteriorly but reaching posterior margin of carapace. Supraorbital spines robust and slightly compressed dorsoventrally, subequal to rostral spines in size. Antennal spines also robust and triangular, directed slightly anterolaterally, subequal to rostral lateral spines. Postsupraorbital spines extremely small, accompanied by 2 to 3 large spinules. Hepatic spine absent as usual in genus. Distance between gastric tubercle and supraorbital spine, measured along midline of carapace, 0.37 times as long as distance between gastric tubercle and cervical groove. Cervical groove distinct, W-shaped in dorsal view. Hepatic, intermediate, and lateral grooves distinct. Distance between orbital margin and cervical groove 1.68 times as long as distance between cervical groove and posterior margin of carapace.

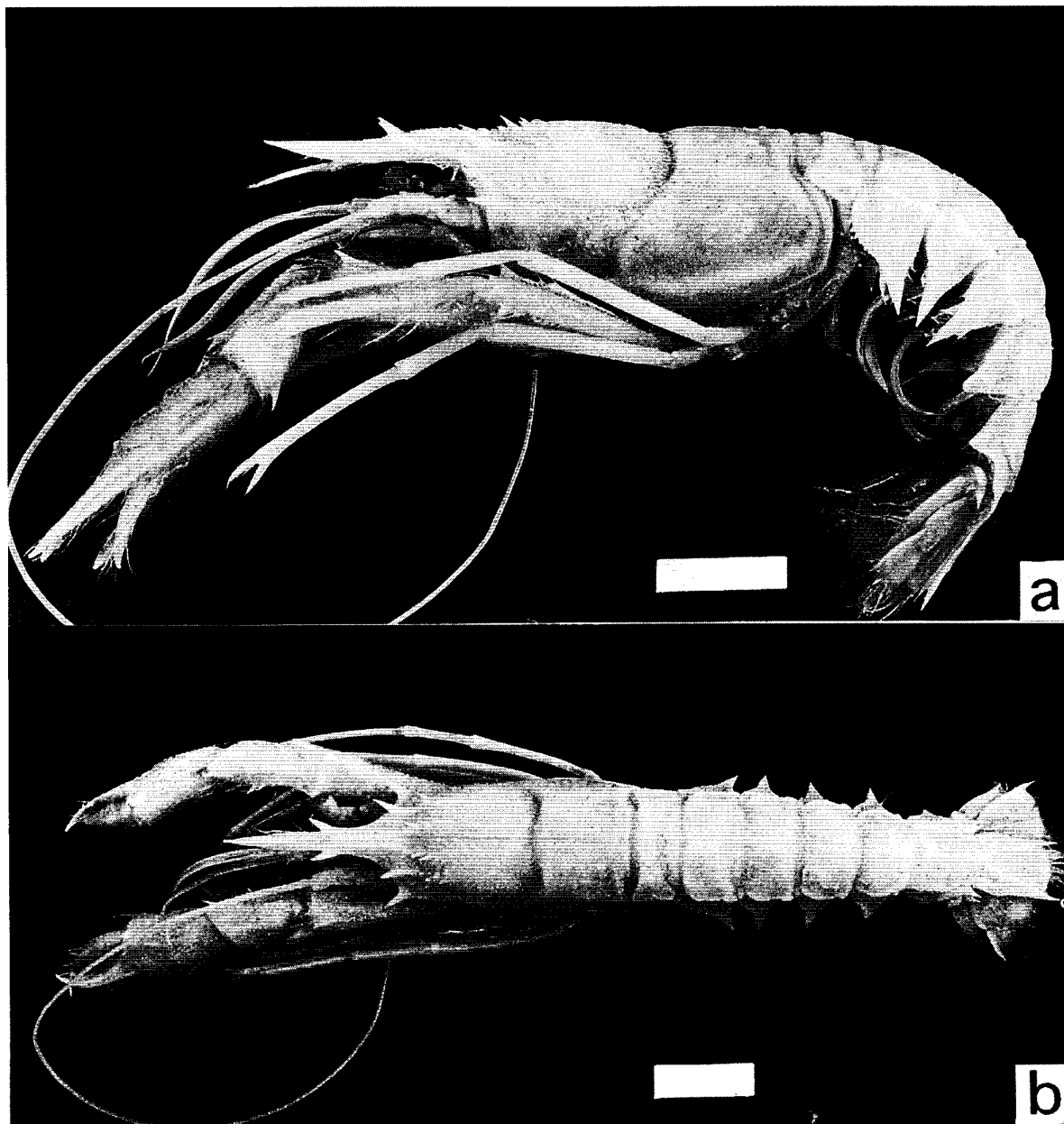


Fig. 3. *Nephropsis macphersoni* new species, holotype, male from east of Terrigal, AM P44029: a, lateral view; b, dorsal view. Scale = 10 mm.

Eyes small, extending to midway between rostral spines and supraorbital spines.

Abdomen slender, comprising 53% of total body length (Fig. 3b). Second to sixth abdominal somites with weak median carina. Tergites densely covered with short, fine setae, separated from pleura by distinct curved, smooth ridge. Pleura densely pubescent and granulose, successively smaller posteriorly; their margins generally unarmed, but 7-8 faint granules present on second and third pleura. Second pleuron markedly convex. Third to sixth pleura straight, each ending in a long, sharp point.

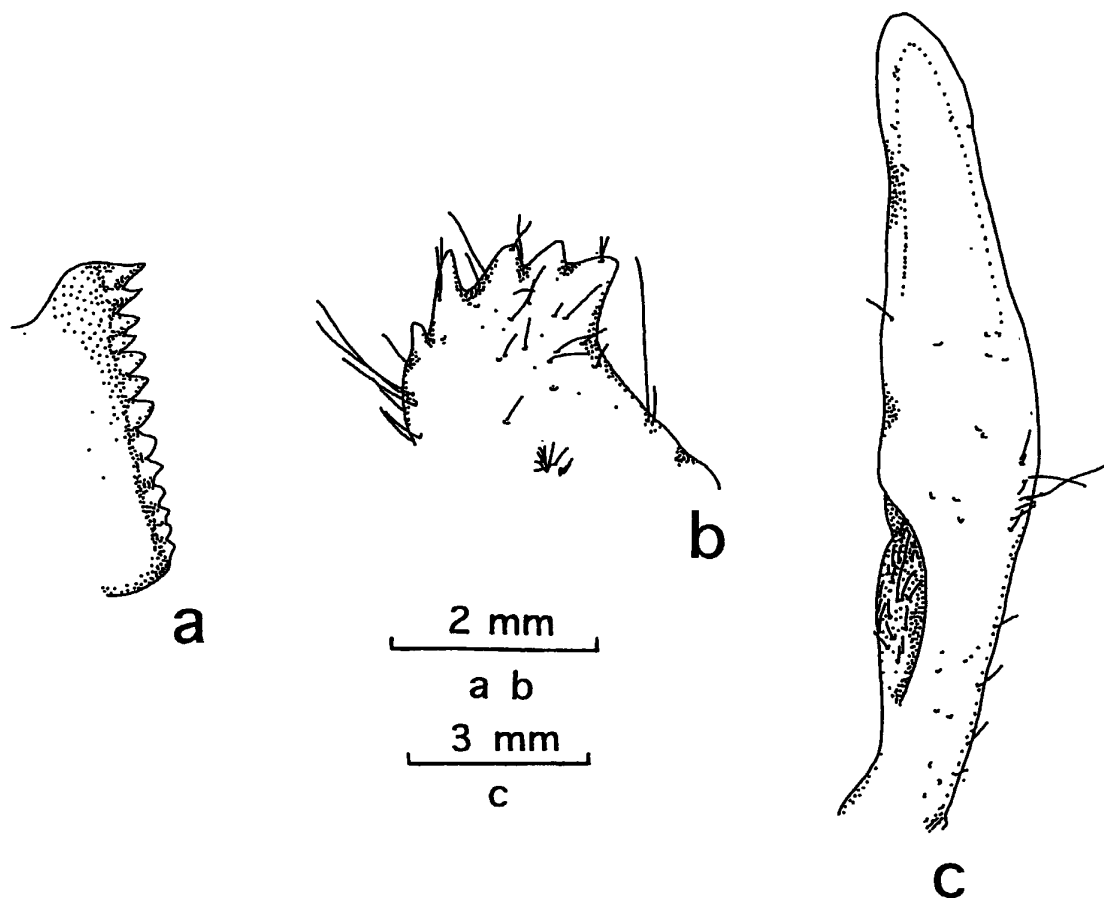


Fig. 4. *Nephropsis macphersoni* new species, holotype, male from east of Terrigal, AM P44029: a, ischium of left third maxilliped, inner view, setae omitted; b, coxa of right third pereopod, anterior view; c, left first pleopod, mesial view.

Ischium of third maxilliped with mesial ridge bearing a row of 15-16 blunt teeth, distalmost largest, remainder diminishing in size proximally (Fig. 4a).

First to third pereopods chelate. First pereopod (Fig. 3b) 1.29 times as long as carapace, slender and pubescent with fine, long setae through entire length, especially on dorsal surface of palm and distal half of carpus. Chelae (Fig. 3a, b) subcylindrical but slightly compressed dorsoventrally, 1.79 times as long as high, slightly granulose. Fixed and movable fingers depressed and slightly widened, approximately same length as palm, distally naked and strongly curved inward; each with 15-20 small teeth. Carpus slender, as long as palm; mesial margin with 2 large spines located at midpoint; ventral margin with a robust, long spine distally; distodorsal margin with a robust spine mesially. Merus less pubescent, nearly naked; dorsal margin with a strong spine distally; distoventral margin armed with a sharp spine mesially. Second pereopod slender, almost naked except for a row of setae on both dorsal and ventral margins; carpus slightly shorter than palm; coxa bearing a large triangular process. Third pereopod more slender than second pereopod; carpus 0.60 times as long as palm; coxa (Fig. 4b) with a broad plate ending in 4 curved, claw-like teeth, anterior three apparently smaller than posterior one. Fourth

pereopod slightly longer than fifth pereopod. Dactyli of fourth and fifth pereopods half as long as propodi.

First pleopod (Fig. 4c) straight and narrowed distally, with rounded, triangular apex. Distal part slightly concave mesially. Anterior margin with deep, narrow incision at midpoint. Appendix masculina of second pleopod slightly shorter than exopod and endopod.

Uropodal exopod bearing a distinct and complete dieresis, with a spine on outer border. Lateral lobe of uropodal protopodite ending in a spine. Mesial lobe distinct. Dorsal surface of telson unarmed.

Paratype. Female paratype differing from male holotype in lacking a plate bearing spines on coxa of third pereopod. Thelycum raised and bisected by narrow median groove; anterior margin with double-ridged, bluntly triangular lobes; posterior groove with 2 semicircular ridges; posterior incision apparently broad.

Remarks. *Nephropsis macphersoni* belongs to the species group containing *N. holthuisi*. However, the following morphological characteristics clearly discriminate *N. macphersoni* from *N. holthuisi*: (1) subdorsal carina bearing distinct spines in *N. macphersoni*, whereas only granulose in *N. holthuisi*; (2) merus and carpus of second pereopod less pubescent in *N. macphersoni* than in *N. holthuisi*; (3) anterior margin of second tergite more strongly granulated in *N. macphersoni* than in *N. holthuisi*; (4) first pereopod more robust in *N. macphersoni* than in *N. holthuisi*.

Etymology. The species is named in honor of E. Macpherson, who established the most recent taxonomic system for the genus *Nephropsis* since the initial foundation by L. B. Holthuis.

Distribution. Known only from northern Australian waters (east of Terrigal, NSW; type locality), 900-1135 m deep.

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